Wireless Local Communities in Mobile Commerce

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INTRODUCTION

In mobile commerce (m-commerce), consumers engage a ubiquitous computing environment that allows them to access and exchange information anywhere and anytime through wireless handheld devices (Lyttinen & Yoo, 2002). While consumers generally sit before personal computers to browse e-commerce websites through the Internet, they are free to move around while connected in m-commerce and can truly be called *mobile consumers*. Compared with stationary consumers in e-commerce, mobile consumers have special information needs regarding their changing environment.

Consumers mainly access information through wireless portals in m-commerce. A lot of these portals provide mobile consumers information specific to where they are. For example, various location-based services have emerged to push information about what is available and occurring nearby to mobile consumers (Rao & Minakakis, 2003). Such wireless portal services overcome the difficulty of searching information with handheld devices, typically cell phones. However, pushing information to users based on where they are may annoy them, because this approach disregards the specific needs and interests of people in context and deprives their control over what they want to know (Barkhuus & Dey, 2003).

In contrast to information pushed by product or service providers, consumers are likely to regard peer-to-peer reference groups as credible sources of product/service information and be open to their informational influence (Miniard & Cohen, 1983). For example, if consumers hear from others that nearby stores offer discounts on certain commodities, they may go to these stores to have a look for themselves. To capitalize on such business opportunities in m-commerce, this article proposes a community portal approach, a so-called *wireless local community* (WLC). As the name suggests, a WLC is a virtual community that allows mobile consumers in a functionally-defined area to exchange information about what is available and occurring nearby with each other through wireless handheld devices.

By far, most virtual communities are built upon the infrastructure of the Internet and they refer to "… groups of people with common interests and needs who come together online… to share a sense of community with like-minded strangers, regardless of where they live" (Hagel & Armstrong, 1997, p.143). Like members in these online communities, WLC members must share something that they are interested in and need in common. Because WLC membership is geographically determined, WLC coverage areas must "supply" what can potentially meet the interests and needs of mobile consumers in them, and such areas may include: shopping plazas, tourist parks, and sports facilities, among others. These functionally-defined areas, which determine the scope, theme, and membership of WLCs, are the settings in which consumer behavior occurs and they constitute the *supply contexts* of local consumers. In this sense, WLCs are context-based virtual communities, in contrast to most on-line communities, which are generally topic-based.

This article first outlines the macro-level conceptual design of the WLC approach and discusses its technical, operational, and economical feasibilities. The success of WLCs, like that of online communities, largely depends on how micro-level implementations can promote member participation and enhance member experience. Based on an understanding of how mobile consumers share contextual information through the mediation of WLCs, this article discusses specific implementation issues.

WLC CONCEPTUAL DESIGN

WLC conceptual design includes an architectural design and an operational design. The architectural design describes the major components of a WLC system, and the operational design identifies all the parties involved in WLC operations and their roles.

As the platform of a context-based virtual community, a typical WLC system has four major components: positioning system, cell phones, wireless network, and WLC server (Figure 1). First, a positioning system is necessary to determine WLC membership by finding out what people are in which supply contexts. Moreover, the location information associated with a message is helpful for readers to understand which part of a supply context it refers to. There are generally two types of positioning systems, network-based and satellite-based (see Roth, 2004), requiring cell phones to be embedded with either triangulation-microchips or GPS-receivers.

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Figure 1. The architecture of WLC systems

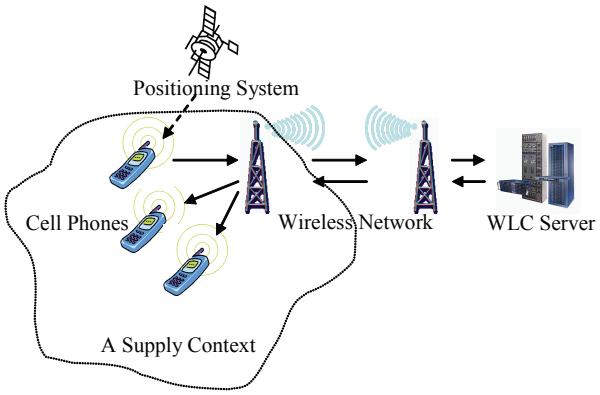

Table 1. Comparisons between two types of virtual communities

Type of Virtual Community	Coverage	User-end Device	Network
Wireless Local Community	Context-based	Cell Phone	Wireless
On-line Community	Topic-based	Personal Computer	Internet

New-generation cell phones are not only positioning-enabled, but also data-capable. Users can post and read short textual messages through the interface of cell phones. Moreover, many cell phones have internal digital cameras, allowing users to take pictures/videos of surrounding objects/events to share with others. A WLC server stores textual messages and multimedia attachments posted by members in chronological order, just like an on-line community server. Based on the display capacity of each cell phone, a WLC server can page the messages accordingly. The data communications between cell phones and a WLC server are carried through a wireless network. From this architectural design, Table 1 compares WLCs with traditional on-line communities.

WLC operations involve business partners, hosts and members. *WLC business partners* are businesses that offer financial resource to establish, operate and upgrade WLCs in their areas. They may also assign WLC moderators for member support and help. *WLC hosts* are wireless carriers (or their agents) that provide necessary infrastructure, mainly wireless networks and WLC servers, and technical support for WLC functioning.

WLC members are cell phone users who join particular WLCs at a moment. When a subscriber wants to find out available WLCs in an area, he/she can click the link "*Wireless Local Communities*" on the cell phone display. Through the positioning system, the cell phone obtains user location information and sends it along with the request to the WLC server. The server determines which WLCs are available in that area and displays them on the cell phone. If the subscriber is interested in a particular WLC, he/she can click its link and join it. Depending on the capacity of cell phone, a person may even join multiple WLCs simultaneously. When a member moves out of a supply context, he/she can either exit the WLC immediately or become a "listener" for a while.

A WLC member can share information about his/her part of the supply context with other members. Because the contributions from different members constitute mutually beneficial conjunction of distinct informational elements as resources for all, the sharing of information among WLC members leads to *informational synergy*. While informational synergy can greatly enhance consumer experience and satisfaction of WLC members, WLC business partners may benefit from increased customer patronage as well. For WLC hosts, the main source of revenue is the service contracts with WLC business partners. Therefore, the WLC approach is a win-win solution for all parties involved.

WLC IMPLEMENTATION ISSUES

The success of virtual communities, to a large extent, depends on the active participation of their members (Whittaker, Isaacs, & O'Day, 1997). Micro-level WLC implementation,

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